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IN THE UNITED STATES
PATENT AND TRADEMARK OFFICE

Applicant: William James Palmteer and Philip
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Application No: 09/966,222

Filing Date: 09/28/2001

Attorney Docket No: 17658

Title: IMPROVED LEADFRAME-BASED
CHIP SCALE PACKAGE

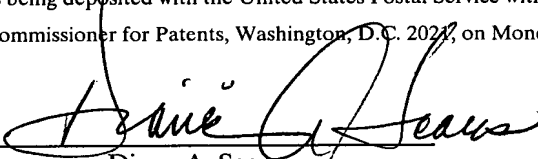
Art Group: 2827

Examiner: Lourdes C. Cruz

Commissioner for Patents
Washington, DC 20231

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to Commissioner for Patents, Washington, D.C. 20231, on Monday, December 23, 2002.


Diane A. Sears

**REPLY UNDER 37 CFR §1.111 TO OFFICE ACTION
DATED SEPTEMBER 23, 2002**

This reply is being filed in response to the Office Action of September 23, 2002 in connection with the above captioned application.

IN THE CLAIMS:

Please delete claim 9.

Please amend the claims as follows:

1. (Amended) A chip scale package comprising:

a leadframe including a die attach pad centrally located therein and a plurality of wire bonding pads peripherally located therein;

at least one aperture formed in the die attach pad;

at least one die formed on the die attach pad;

at least one bonding wire for electrically connecting the at least one die and at least of the plurality of wire bonding pads; and

a mold compound, wherein said mold compound encapsulates the at least one die and the at least one bonding wire to form a chip scale package, and wherein the mold compound resides the at least one aperture.

REMARKS

The changes made to the claims are shown on “**Marked-Up Version of Amended Claims**” attached hereto.

Drawings

Figures 2A, 2B, 2C, 2D, and 3 have been edited to correct the cross hatching pattern shown in the metal areas of the chip scale package. Figure 1B showing the prior art is correctly cross-hatched in accordance with MPEP §608.02.

Claim Rejections - 35 USC §112

The U.S. Patent and Trademark Office (“Office”) has rejected claims 8 and 9 under the second paragraph of 35 U.S.C. §112 for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8 states that the at least one die includes first and second dies, and that at least one aperture is disposed between the first and the second dies. The Office has stated that it is unclear how an aperture in the die attach pad will be disposed between the dies while the dies are included with one single structure. The at least one die is formed *on* the die attach pad. The aperture is formed *in* the die attach pad. When the at least one die comprises two dies, and the first die and second die are located on opposite sides of the one of the plurality of apertures, the one of the plurality of apertures is disposed between the dies.

Claim 9 has been deleted.

Claim Rejections - 35 USC §102

The Office has rejected claims 1-9 under 35 USC §102 as being anticipated by U.S. Patent No. 6,143,981 issued to Glenn ("Glenn").

With respect to claim 1, as amended, the Applicant respectfully traverses the Office's rejection. The Office states that claim 1 is anticipated by Glenn; however, Glenn fails to disclose all of the features claimed in claim 1. Claim 1 of the present application claims a chip scale package with at least one aperture *formed in the die attach pad*. This feature is not taught in Glenn, and is critical to the present invention.

Glenn teaches building a small chip package by using a saw to cut an encapsulated leadframe, thereby severing the disposable portions of the leadframe (col. 2, ll. 30-32). The encapsulant material is used to hold the die pad and contents to the package (col.2, ll. 46-47). The connection of the encapsulant material to the die is enhanced only by the reentrant portions and asperities of the side surfaces of the die pad and contacts (col. 2, ll. 47-52).

The chip scale package as disclosed in Glenn is represented in the present application in Figure 1A and Figure 1B, which illustrate the prior art. Figure 1B is a cross-sectional view of a chip scale package having features in accordance with Glenn. However, this package suffers from a significant problem because the encapsulant (20 in Fig. 1B) does not properly adhere to the surface of the die attach pad (12 in Fig. 1B). *See* page 3, ll. 2-4 of the present application.

The present invention overcomes this problem by using an aperture formed in the die attach pad. *See* 65, 66, 67 of Figs. 2A, 2B, 2C, and 2D. The aperture increases adhesion between the encapsulant (60 in Fig. 2A) and the die attach pad (52 in Fig. 2A) by increasing the adhesion surface area on the die attach pad.

This feature is not taught in Glenn. The Office refers to Figure 8 of Glenn to support the assertion that Glenn discloses at least one aperture in the die attach pad. The Office states Glenn discloses "... at least one aperture (where the encapsulant meets side 33) in the die

attach pad.” See page 3 of the Office Action. However, this assertion is incorrect. Side 33 as shown in Figure 8 of Glenn identifies a side of a wire bonding pad 53. The die attach pad is identified as 24 in Figure 8. In Glenn, there is no aperture in die attach pad 24.

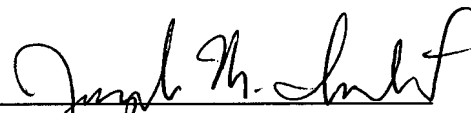
Claim 1 of the present application claims an aperture *formed in the die attach pad*. The problem encountered in the prior art was that the encapsulant would not properly adhere to the die attach pad, creating gaps between the encapsulant material and the die attach pad known as delamination. See page 3, lines 4-7. The die attach pad is subject to delamination due to its relatively large size, while the wire bond pads are much smaller in size and, thus, are not as susceptible to delamination. In order to overcome this problem, the present invention uses an aperture formed in the die attach pad to increase adhesion between the die attach pad and the mold compound used as the encapsulant. This feature is not disclosed in Glenn.

Because Glenn does not teach the features claimed in Claim 1 of the present invention, the Applicant respectfully requests that the rejection under 35 U.S.C. §102 be withdrawn.

Conclusion

In view of the foregoing amendments and remarks, this application is now in condition for allowance. Applicant respectfully requests the Office to issue a Notice of Allowance at the earliest possible date. The Examiner is invited to contact Applicant’s undersigned counsel by telephone call in order to further the prosecution of this case in any way.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Joseph M. Inhof", written over a horizontal line.

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